DEFENSE INFORMATION SYSTEMS AGENCY
JOINT INTEROPERABILITY TEST COMMAND
2001 BRAINARD ROAD
FORT HUACHUCA, ARIZONA 85613-7051

IN REPLY
REFER TO: Networks, Transmission and
Intelligence Division (JTE)

MEMORANDUM FOR DISTRIBUTION ***Signed October 24, 2002***

SUBJECT: Joint Interoperability Test Certification of The Army Distance Learning Program (TADLP) Video Teleconferencing Suite Block 2 for the Defense Switched Network (DSN) Primary Rate Interface (PRI) and Basic Rate Interface (BRI)

References: (a) DOD Directive 4630.5, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 11 January 2002

(b) CJCSI 6212.01B, "Interoperability and Supportability of National Security Systems and Information Technology Systems," 8 May 2000

1. References (a) and (b) establish the Defense Information Systems Agency (DISA), Joint Interoperability Test Command (JITC), as the responsible organization for interoperability test certification. Additional references are provided in enclosure 1.

2. The Army Distance Learning Program (TADLP) Video Teleconferencing Suite as detailed in table 1 meets the Integrated Services Digital Network Basic Rate Interface (BRI) and Primary Rate Interface (PRI) interoperability requirements for the Defense Switched Network (DSN) and is certified for joint use in the Defense Information System Network (DISN). This certification expires upon changes that affect interoperability, but no later than three years from the date of this memorandum.

JITC Memo, Networks, Transmission and Intelligence Division (JTE), Joint Interoperability Test Certification of The Army Distance Learning Program (TADLP) Block 2 Video Teleconferencing Suite for the DSN Primary Rate Interface (PRI) and the Basic Rate Interface (BRI)

3. These findings are based on interoperability testing conducted by the JITC, 18 June to 17 July 2002. Testing was conducted between the JITC Network Engineering and Integration Lab (NEIL), Fort Huachuca, Arizona and various DSN backbone facilities to include the Network Engineering Assessment Facility (NEAF), Falls Church, Virginia, Fort Eustis Network Control Center (NCC), Virginia, and the DISN Video Services Global (DVSG) laboratory, Ft. Huachuca, Arizona. Testing of the TADLP Video Teleconferencing Suite was in accordance with references (c) and (e). Requirements were derived from reference (d). The Certification Testing Summary (enclosure 2) documents the test results and describes the test network. This testing was not applicable to the TADLP Operational Requirements Document (ORD), which does not address the interoperability with the DSN.

Table 1. TADLP Video Teleconferencing Suite

Hardware	Firmware
VTEL Cameraman, Parkervision, VTEL Camera System II Model VAC-2112-AIN REV 001	Not Applicable
VTEL Monitors: Sony KV35542 Panasonic CT36G33W	Not Applicable
VTEL Codec Models: TC07877 TC13293 TC13241	Video Algorithm: H.261 COMM Protocol: H.221 Audio Send: G.722 Audio Receive: G.722
ADTRAN ISU 512	VER E00 Cksum 73af VER J.SJ Cksum ab6b VER P.GM Cksum 8cec

LEGEND

ADTRAN	Product name, not an acronym
Codec	Coder/decoder
Cksum	Checksum
COMM	Communications
ISU	Integrated Services Digital Network Service Unit
REV	Revision
TADLP	The Army Distance Learning Program
VTEL	Vendor name, not an acronym

4. The TADLP Video Teleconferencing Suite delivers standardized individual, collective, and self-development video

teleconferencing training to the warfighter worldwide through the application of information technologies. The interoperability status of the TADLP Video Teleconferencing Suite is indicated in table 2.

Table 2. TADLP Video Teleconferencing Suite Application Exchange Requirements

Interface Requirements	Critical	Exchange Requirements	Status	Remarks
ISDN BRI	Yes	384 Kbps BERT 384 Kbps Bonding 1 VTC	Certified	All exchange requirements are met.
ISDN PRI T1	Yes	384 Kbps BERT 384 Kbps Bonding 1 VTC	Certified	All exchange requirements are met.

LEGEND

BRI	Basic Rate Interface
BERT	Bit Error Rate Test
ISDN	Integrated Services Digital Network
Kbps	Kilobits per second
PRI	Primary Rate Interface
T1	1.544 Megabits per second North American transmission
VTC	Video TeleConference

5. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system -- ERD uses unclassified (NIPRNET) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/.gov users on the NIPRNET at: https://stp.fhu.disa.mil/. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at: http://jit.fhu.disa.mil (NIPRNET), or http://199.208.204.125/ (SIPRNET).

JITC Memo, Networks, Transmission and Intelligence Division (JTE), Joint Interoperability Test Certification of The Army Distance Learning Program (TADLP) Block 2 Video Teleconferencing Suite for the DSN Primary Rate Interface (PRI) and the Basic Rate Interface (BRI)

6. The JITC point of contact is Mr. John M. Hooper, DSN 879-5041 or commercial (520) 538-5041. The e-mail address is hooperj@fhu.disa.mil.

FOR THE COMMANDER:

2 Enclosures:
1 Additional References
2 Certification Testing Summary

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ADDITIONAL REFERENCES

(c) Defense Information Systems Agency (DISA)/ Network Systems (NS), "TADLP Video Teleconferencing Certification Test Plan," July 2002

(d) Defense Information Systems Agency (DISA), Joint Interoperability and Engineering Organization (JIEO), Technical Report 8249, "Defense Information System Network (DISN) Circuit Switched Subsystem, Defense Switched Network (DSN) Generic Switching Center Requirements (GSCR)," March 1997

(e) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP)," 17 June 1999

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. The Army Distance Learning Program (TADLP) Video Teleconferencing Suite Block 2 for the Defense Switched Network (DSN) Primary Rate Interface (PRI) and Basic Rate Interface (BRI) (hereafter referred to as the System Under Test (SUT)).

2. PROPONENT. Defense Information Systems Agency (DISA).

3. PROGRAM MANAGER. Mr. Howard Osman, NS53, Room 5W23, 5275 Leesburg Pike, Falls Church, VA 22041, e-mail: Osmanh@ncr.disa.mil.

4. TESTERS. Joint Interoperability Test Command (JITC), Fort Huachuca, Arizona.

5. SYSTEM UNDER TEST DESCRIPTION. The SUT is currently used within the Public Switched Telephone Network (PSTN) to deliver standardized individual, collective, and self-development video teleconferencing (VTC) training to soldiers and units anywhere and anytime through the application of information technologies. This test was conducted to certify the interoperability of the SUT over the DSN. Table 1 lists the components of the SUT. A typical video VTC call is initiated when the SUT receives a call from the Fort Eustis Network Control Center (NCC). Fort Eustis NCC then bridges the SUT to a Digital Training Facility. When the connection is made between the SUT and the Digital Training Facility, two-way live VTC distant training can be conducted.

6. OPERATIONAL ARCHITECTURE. The SUT was tested in seven distinct configurations that accurately emulated how it will be deployed in the operational DSN environment. The DSN operational architecture is defined in Defense Information Systems Agency (DISA), Joint Interoperability and Engineering Organization (JIEO), Technical Report 8249, "Defense Information System Network (DISN) Circuit Switched Subsystem, Defense Switched Network (DSN) Generic Switching Center Requirements (GSCR)," March 1997.

7. REQUIRED SYSTEM INTERFACES. Table 2 details the interfaces and Exchange Requirements (ERs) required for interoperability certification of the SUT. Interoperability certification of the interfaces is based on meeting criteria from the ERs.

8. TEST NETWORK DESCRIPTION. The test network configurations depicted in Figures 1 through 7 were used to test the SUT, which accurately emulated the DSN operational environment. A DSN VTC 384 Kbps call requires six bearer channels to complete and these six bearer channels may or may not be distributed on the same trunkgroup. There will be instances on the DSN when a VTC 384 Kbps call will complete over multiple trunkgroups and different trunkgroup types; this type of call completion will split the required six bearer channels over more than one trunkgroup. This condition was emulated on all scenarios except scenarios 3, 5, and 7 (bearer channel split was not applicable for scenarios 3, 5, and 7) during the certification testing.

Scenario 1 (figure 1) depicts a bearer channel split configuration on both the local side and network side. The local side bearer channel split was performed on two identical trunkgroup types with each trunkgroup having three idle bearer channels available for call completion. The network side bearer channel split was performed on three different trunkgroup types with each of the different trunkgroups having two idle bearer channels available for call completion. Scenario 2 (figure 2) had a network side bearer channel split with like trunkgroups and with each trunkgroup having three idle bearer channels available for call completion. Scenario 3 (figure 3) consisted of an ADTRAN (product name, not an acronym) 550, which was used to convert a single ISDN PRI network interface to three ISDN BRI interfaces to the SUT. The network side only bearer channel splits on Scenario 4 (figure 4) were configured with three different trunkgroup types with each trunkgroup having two idle bearer channels available for call completion. Scenario 5 (figure 5) was the same as scenario 3 with the exception that tow RADCOM DXC-2 (product name, not an acronym) devices were inserted in the network to convert the ISDN PRI interface to a 2.048 megabits per second European transmission. Scenario 6 (figure 6) bearer channel split configuration was the same as Scenario 4 (figure 4). Scenario 7 (figure 7) consisted of three ISDN BRI interfaces delivered to the SUT by a Nortel Networks Meridian Switching Load 100 Remote Switching Unit. The ADTRAN 512 Integrated Services Digital Network Service Unit (ISU) switch setup was National Integrated Services Digital Network 1 (NI-1) in all scenarios with the exception of the scenario involving Avaya Definity G3R Small End Office Switch (figure 2). The ADTRAN 512 ISU switch setup was AT&T (this is not an acronym, formally known as the American Telephone and Telegraph) Electronic Switching System 5 Custom (AT&T 5ESS Custom) for the Avaya Definity G3R Small End Office Switch.

Table 1. TADLP Video Teleconferencing Suite

Hardware	Firmware
VTEL Cameraman, Parkervision, VTEL Camera System II Model VAC-2112-AIN REV 001	Not Applicable
VTEL Monitors: Sony KV35542 Panasonic CT36G33W	Not Applicable
VTEL Codec Models: TC07877, TC13293, TC13241	Video Algorithm: H.261 COMM Protocol: H.221 Audio Send: G.722 Audio Receive: G.722
ADTRAN ISU 512	VER E00 Cksum 73af VER J.SJ Cksum ab6b VER P.GM Cksum 8cec

LEGEND

ADTRAN	Product name, not an acronym
Codec	Coder/decoder
Cksum	Checksum
COMM	Communications
ISU	Integrated Services Digital Network Service Unit
REV	Revision
TADLP	The Army Distance Learning Program
VTEL	Vendor name, not an acronym

Table 2. TADLP Video Teleconferencing Suite Application Exchange Requirements

Interface Requirement	Critical	Exchange Requirements	Exchange Method	References
ISDN BRI	Yes	384 Kbps BERT 384 Kbps Bonding 1 VTC	- ANSI T1.619a - NI-1 - NI-2 - AT&T 5ESS Custom	GSCR Mar 97 DISA/NS TADLP Test Plan Jul 02
ISDN PRI T1	Yes	384 Kbps BERT 384 Kbps Bonding 1 VTC	NI-2	GSCR Mar 97 DISA/NS TADLP Test Plan Jul 02

LEGEND

5ESS	Electronic Switching System 5
ANSI	American National Standards Institute
AT&T	Corporation name, not an acronym
BRI	Basic Rate Interface
BERT	Bit Error Rate Test
DISA/NS	Defense Information System Agency/Network Systems
GSCR	Generic Switching Center Requirements
ISDN	Integrated Services Digital Network
Kbps	Kilobits per second
NI-1	National ISDN 1
NI-2	National ISDN 2
PRI	Primary Rate Interface
TADLP	The Army Distance Learning Program
T1	1.544 Megabits per second North American transmission
VTC	Video TeleConference

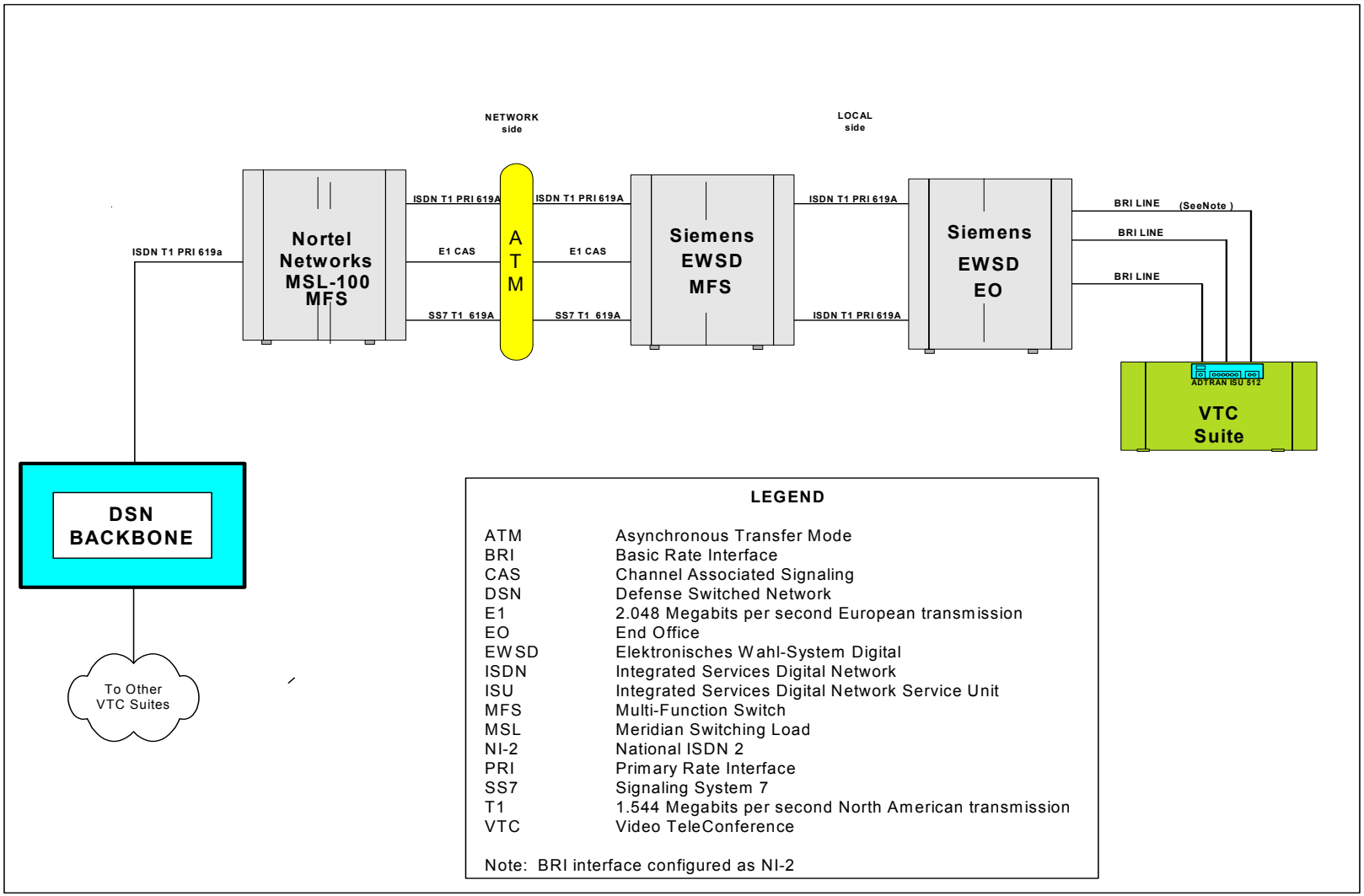

Figure 1. Test Scenario 1 (Siemens EWSD NI-2 BRI)

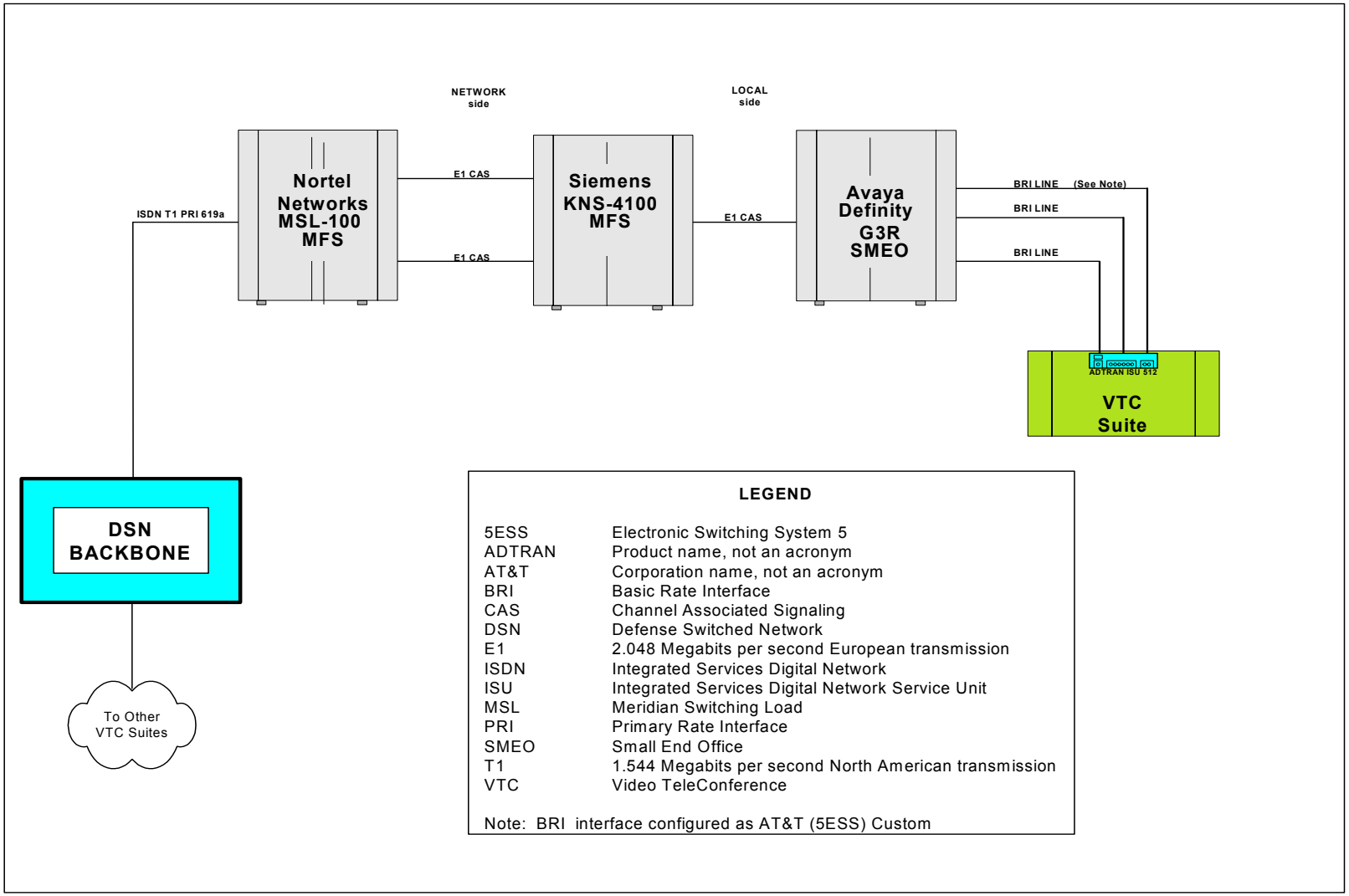

Figure 2. Test Scenario 2 (Avaya Definity G3R AT&T (5ESS) Custom BRI)

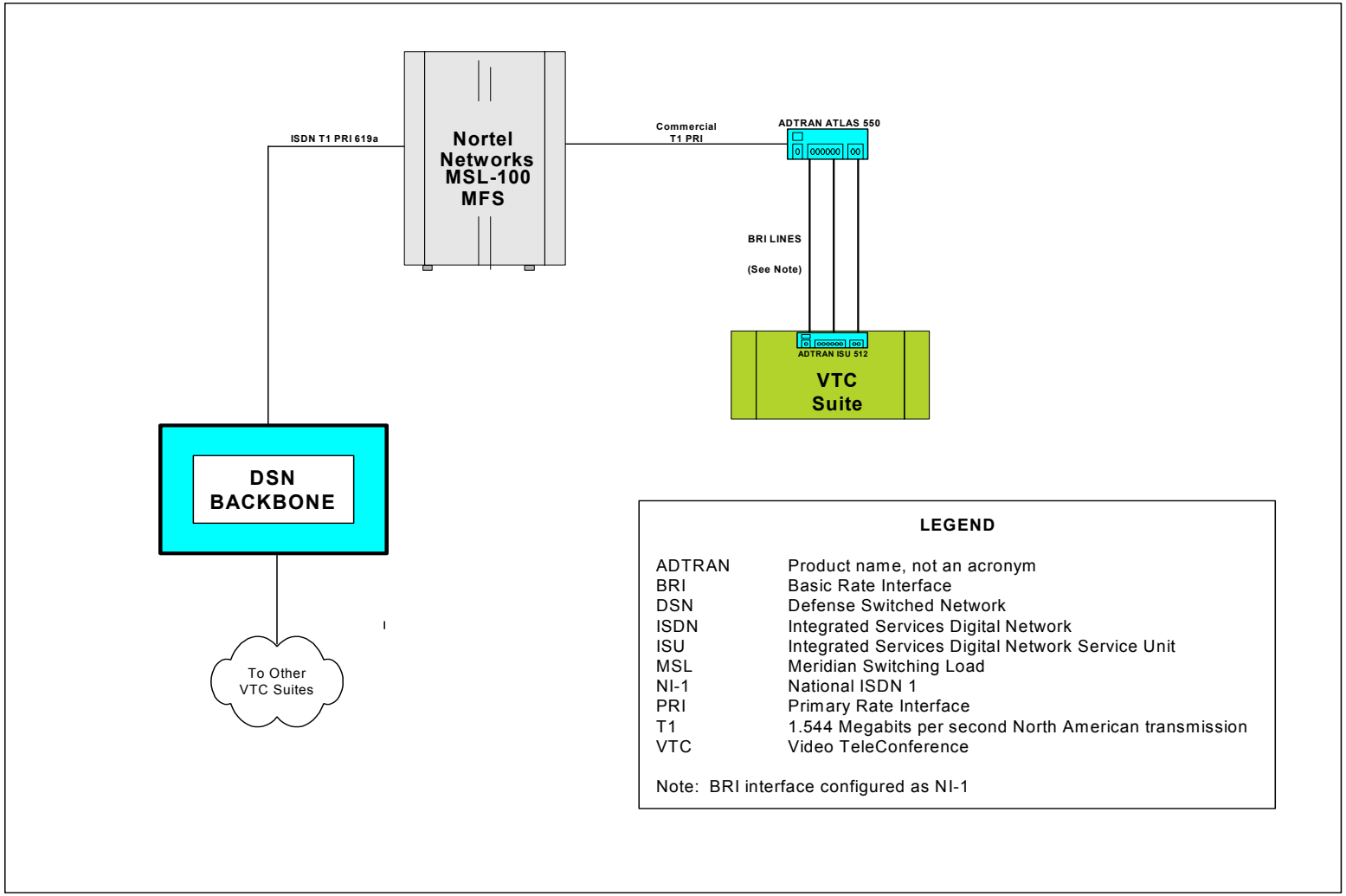

Figure 3. Test Scenario 3 (Nortel Networks MSL100/ADTRAN ATLAS 550 NI-1 BRI)

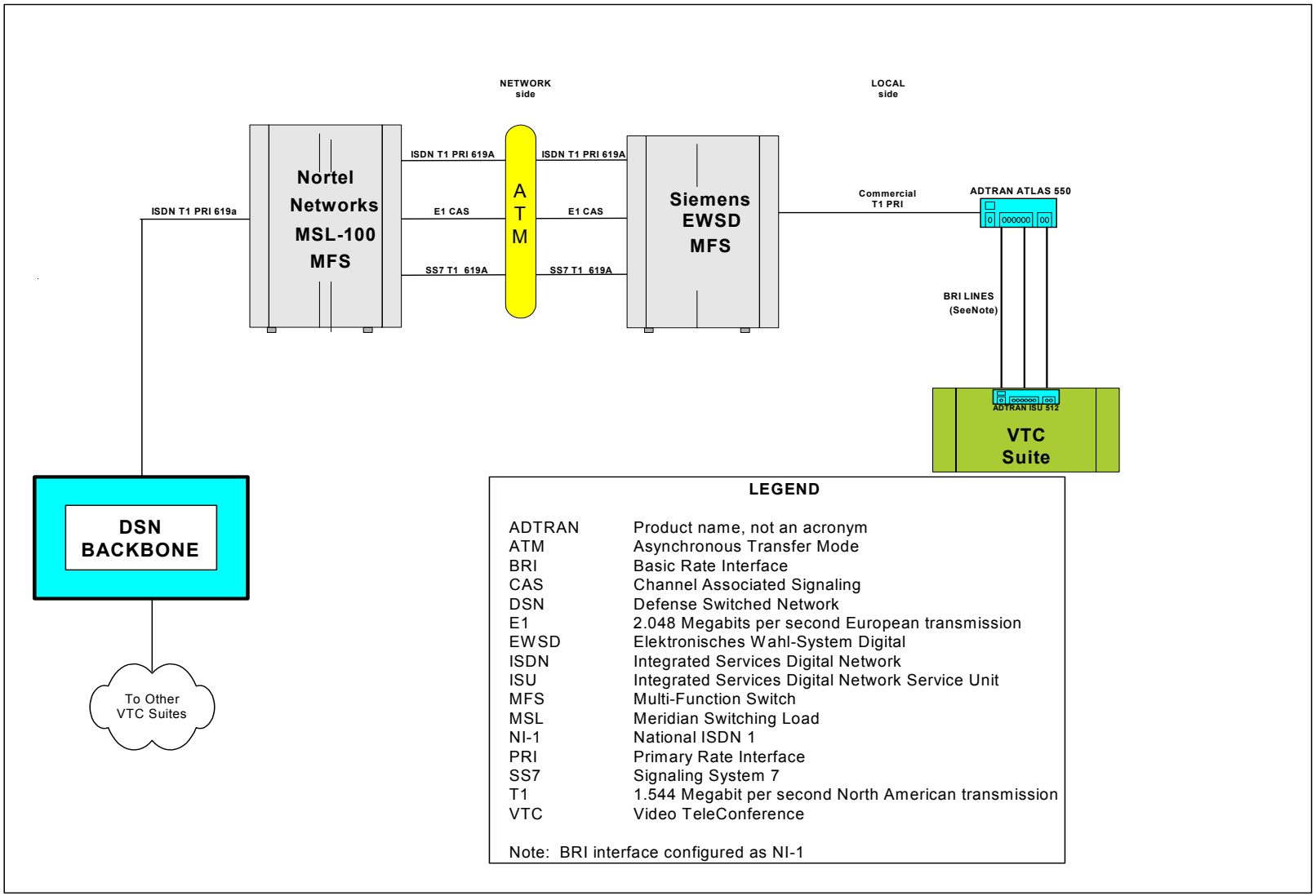

Figure 4. Test Scenario 4 (Siemens EWSD/ADTRAN ATLAS 550 NI-1 BRI)

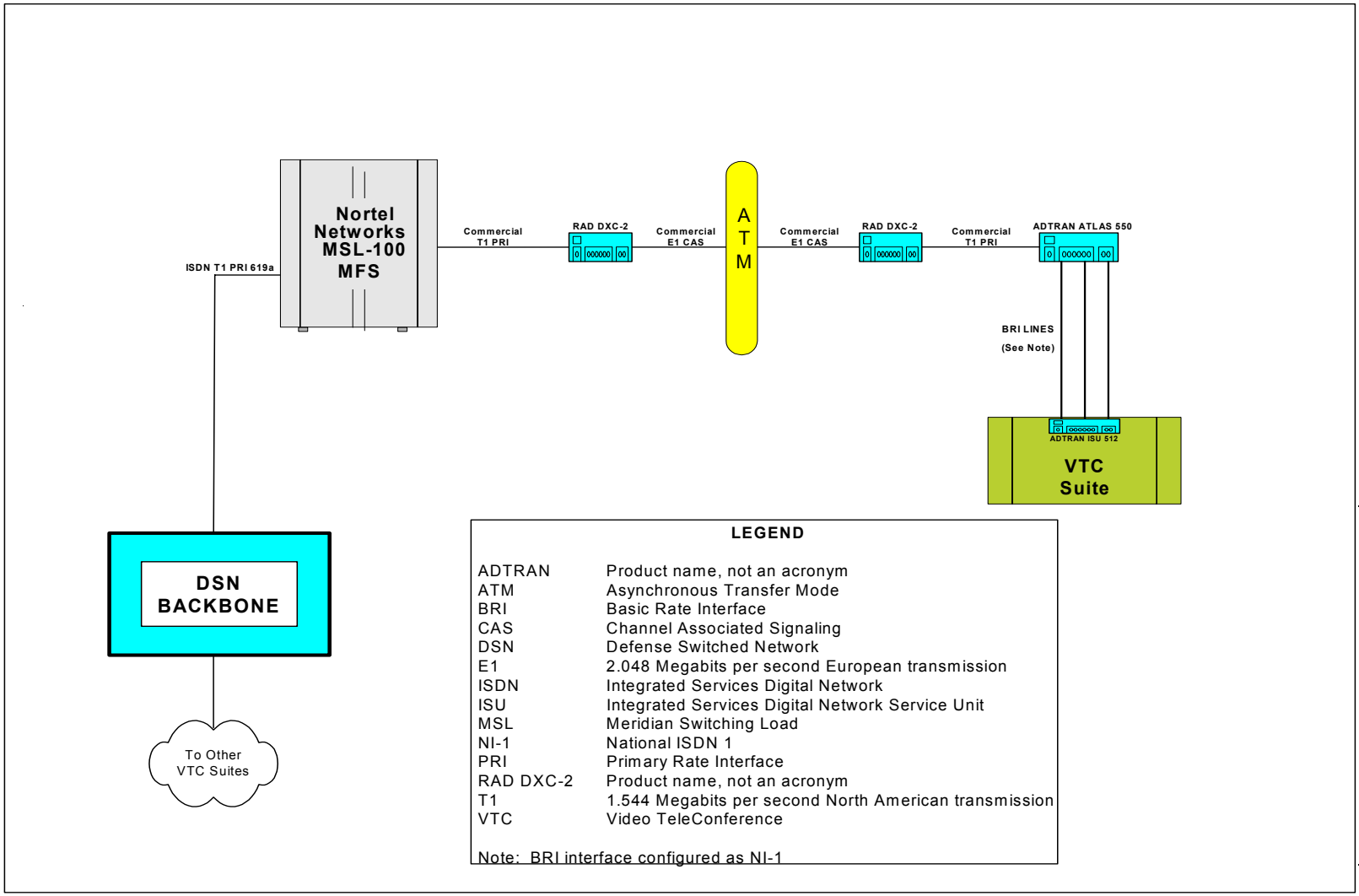

Figure 5. Test Scenario 5 (RAD DXC-2/ADTRAN ATLAS 550 NI-1 BRI)

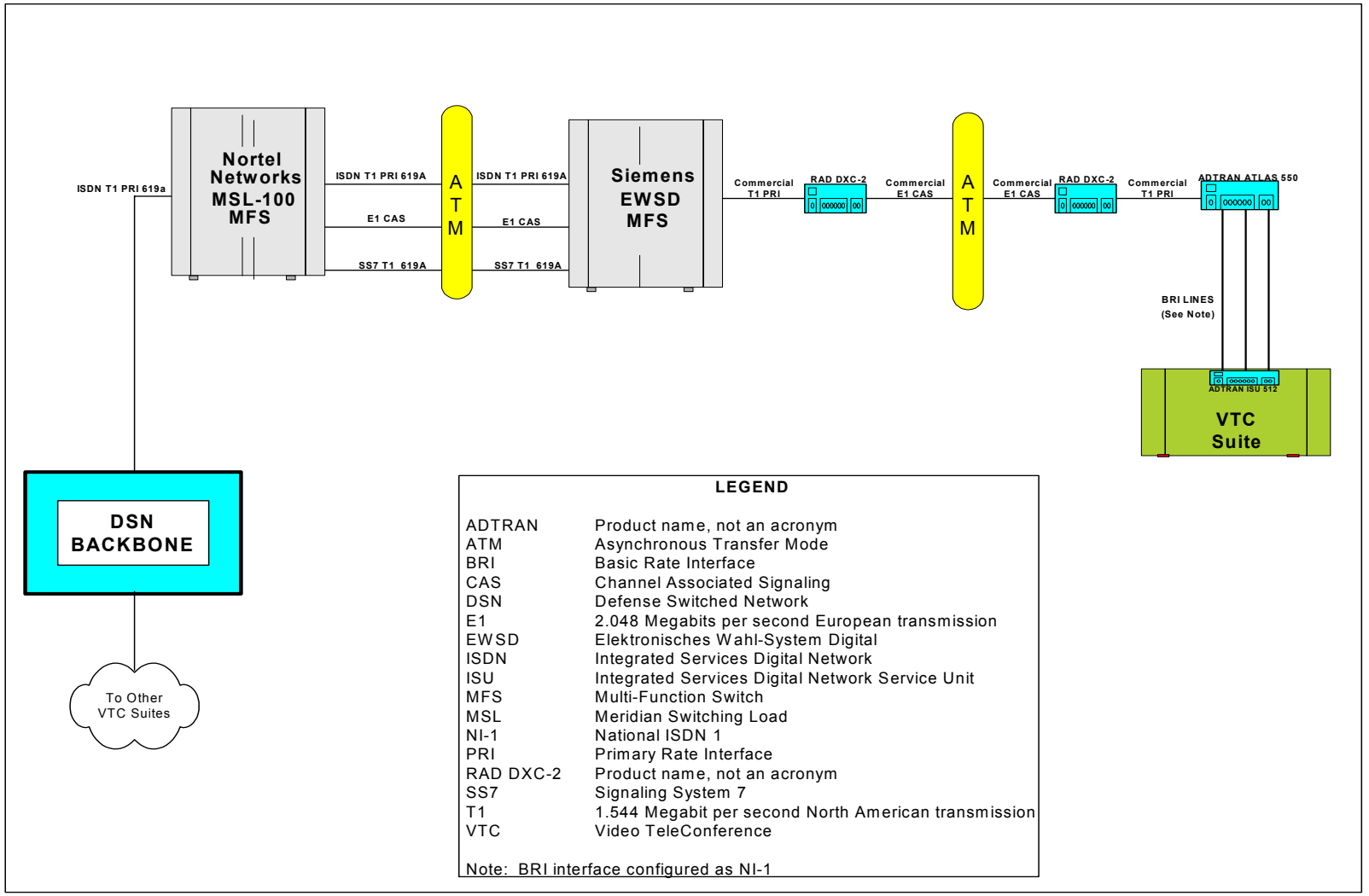

Figure 6. Test Scenario 6 (RAD DXC-2/ADTRAN ATLAS 550 NI-1 BRI)

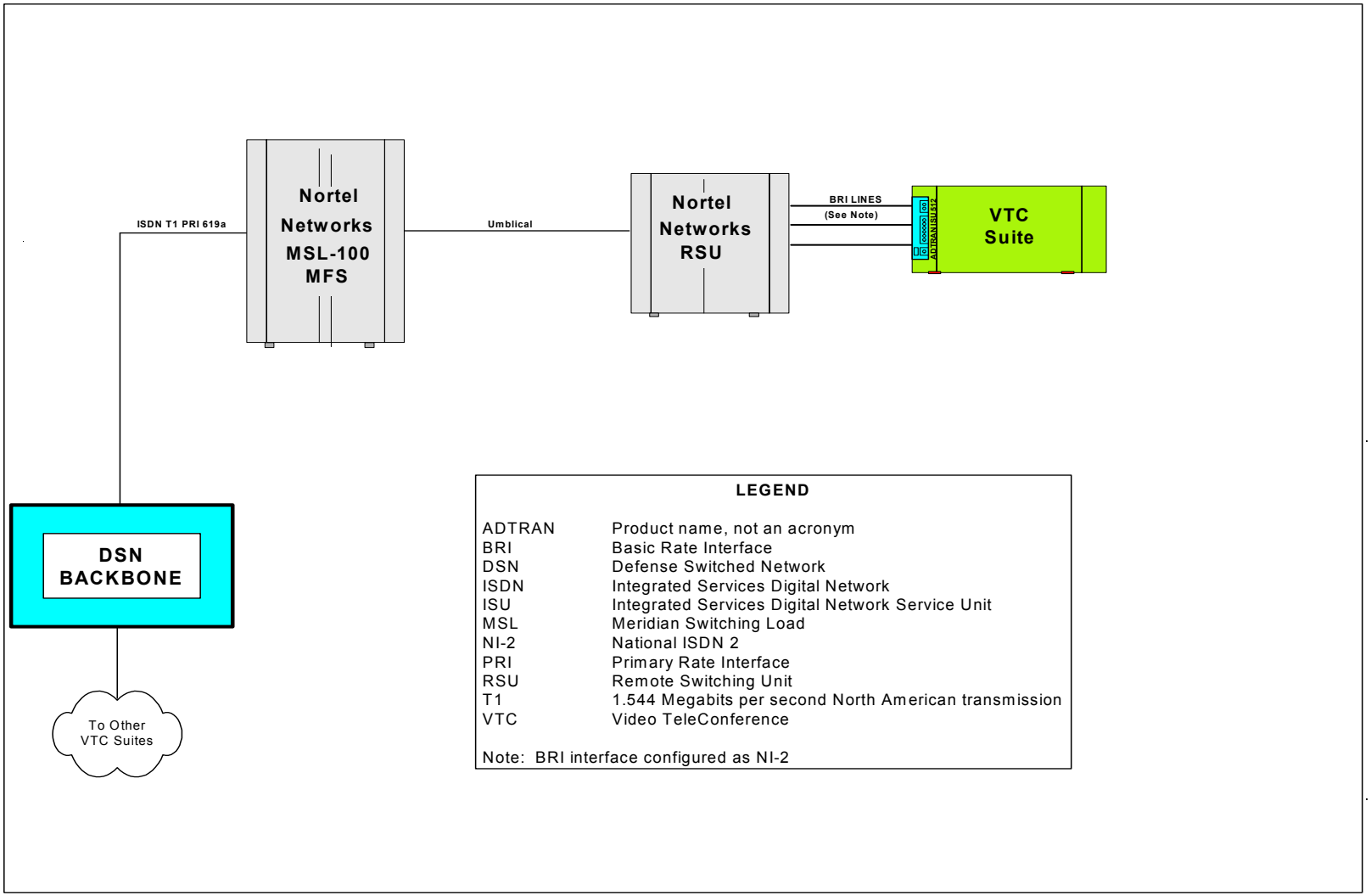

Figure 7. Test Scenario 7 (Nortel Networks RSU NI-2 BRI)

9. SYSTEM CONFIGURATIONS. Table 3 lists the hardware and software configurations associated with the systems used during the test.

Table 3. Tested System Configurations

System Name	Hardware	Software
ADTRAN ATLAS 550	Revision C.06.01	Not Applicable
RAD DXC-2	RAD DXC-2	DXC2 REV 0.8
Avaya Definity G3R	RISC Processor	Release G3V10r.7585.6.0.2
Siemens EWSD	CP 113C	Release 19D with Patch Set 25
Nortel MSL-100	RISC Processor	Release MSL 17

LEGEND

ADTRAN	Product name, not an acronym
CP	Central Processor
EWSD	Elektronisches Wahl-System Digital
G3R	Product name, not an acronym
MSL	Meridian Switch Load
RAD DXC	Product name, not an acronym
RISC	Reduced Instruction Set Computing

10. TEST LIMITATIONS. None.

11. ASSESSMENT RESULTS. The following results apply to both the BRI ISDN and ISDN PRI testing. All tests were in accordance with the Defense Information Systems Agency/Network Services TADLP Test Plan, dated July 2002. The pass or fail criteria for both video and voice was based on the subjective scale shown below and was used to determine that the quality of TADLP services provided by the DSN is as good or better than the current service provided by the Public Switched Telephone Network. All calls placed resulted in score of 5 (Excellent).

1 Unusable: Connection unusable by operators
2 Poor: Connection just usable by operators
3 Fair: Signal quality seriously affected.
4 Good: Signal quality slightly affected
5 Excellent: Signal quality unaffected

(a) Three consecutive 5-minute video teleconferencing calls were successfully accomplished on each scenario. The calls were made in both directions for a total of six 5-minute video teleconferencing calls during each scenario in accordance with the Defense Information Systems Agency/Network Services TADLP Test Plan.

(b) One-hour end-to-end bit error rate tests were successfully accomplished on all scenarios. The bit error rate achieved was 10^{-9} for each scenario,

considered good by industry standards and called for by DISA engineers in accordance with the Defense Information Systems Agency/Network Services TADLP Test Plan.

(c) The bearer channel splits were not found to impair the completion of video teleconferencing calls in either direction during any scenario. This test was in accordance with the Defense Information Systems Agency/Network Services TADLP Test Plan.

(d) Three Multi-Level Precedence and Preemption (MLPP) calls were successfully made during each scenario to ensure that MLPP calls did not hang-up the system and subsequent VTC calls could be established. The TADLP suite recovered from this preemption normally and was able to make or receive a new call immediately. This test was in accordance with the Defense Information Systems Agency/Network Services TADLP Test Plan.

(e) The insertion of 648 ms of maximum total delay on each scenario had no appreciable effect on any of the video calls. This test in accordance with the Defense Information Systems Agency/Network Services TADLP Test Plan.

(f) The random bit error insertion test results indicate that local side random bit error insertion at 10^{-5} causes the SUT video teleconferencing call to drop. Local side random bit error insertion at 10^{-6} and 10^{-7} caused minor call degradation (some freeze framing) but the video calls remained up and of acceptable quality. These test results were considered good by industry standards and called for by DISA engineers. This test was in accordance with the Defense Information Systems Agency/Network Services TADLP Test Plan.

(g) The ability of Fort Eustis NCC to use the DSN backbone to connect each of the SUT scenarios into a video teleconference bridge with four additional remote Digital Training Facilities was demonstrated to the TADLP customer. The duration of each of these video teleconferencing calls was a minimum of 45 minutes in accordance with the Defense Information Systems Agency/Network Services TADLP Test Plan.

12. SUMMARY. The Army Distance Learning Program (TADLP) Block 2 Video Teleconferencing Suite for the DSN Primary Rate Interface (PRI) and Basic Rate Interface (BRI) effectively interoperates with the DSN. The test network configurations used to test The Army Distance Learning Program (TADLP) Block 2 Video Teleconferencing Suite accurately emulated that of the DSN operational environment. The Army Distance Learning Program (TADLP) Block 2 Video Teleconferencing Suite for the DSN Primary Rate Interface (PRI) and Basic Rate Interface (BRI) is certified for joint use in the DSN, in accordance with the requirements set forth in reference (d) of the Joint Interoperability Test Certification memorandum of The Army Distance Learning Program (TADLP) Video Teleconferencing Suite. This testing was not applicable to the TADLP Operational

Requirements Document (ORD), which does not address the interoperability with the DSN.